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RESEARCH PAPERS

三维混合层中大涡结构与扩散颗粒的相互作用

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摘要 In order to understand the interaction between large-scale vortex structure and particles,
a two-waycoupling temporal mixing layer laden with particles at a Stokes number of 5 with different mass loading plantedinitially in the upper half region is numerically studied.
The pseudospectral method is used for the flow fluid andthe Lagrangian approach is employed
to trace particles. The momentum coupling effect introduced by a particle isapproximated to a point force. The simulation results show that the coherent structures are still dominant in themixing layer, but the large-scale vortex structure and particle dispersion are modulated. The length of large-scalevortex structure is shortened and the pairing is delayed. At the same time, the particles are distributed more evenlyin the whole flow field as the mass loading is increased, but the particle dispersion along the transverse directiondiffers from that along the spanwise direction, which indicates that the effect by the addition of particle on thespanwise large-scale vortex structure is different from the streamwise counterpart.

关键词 interaction modulation two-way coupling large-scale vortex structures particle dispersion

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Interaction between large-scale vortex structure and dispersed particles in a three dimensional mixing layer

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Key words interaction; modulation; two-way coupling; large-scale vortex structures; particle dispersion

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